ASPECTS OF TLACHICHILCO TEPEHUA (TOTONACAN) PHONOLOGY

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Abbreviations

ant	anterior	prin	principle
AP	anti-passive	pt	punctiliar
cl	numeral classifier	R	rule
comp	completive	ref	referent
cons	consonantal	res	resumptive
cont	continuant	sg	singular
del rel	delayed release	Si	syllable-initial
desid	desiderative	Sf	syllable-final
foc	focus	son	sonorant
H	Huehuetla Tepehua	SSS	standard syllable structure
int	intransitivizer	strid	strident
lar	laryngeal	sub	subject
M	means	surf	surface
obj	object	syll	syllable
pf	perfect	TT	Tlachichilco Tepehua
PF	Pisa Flores Tepehua	UF	underlying form
pl	plural	1	first person
poss	possessor	2	second person
pr	progressive	3	third person

0. The purpose of this paper is to present some aspects of Tlachichilco Tepehua (TT) phonology with special focus on the morphophonemics of the verb.[1,2]

TT is one of three Tepehua dialects spoken in the states of Hidalgo and Veracruz in Mexico. There is a low degree of intelligibility between TT and the other two dialect areas, Pisa Flores (PF) and Huehuetla (H). Tepehua is very clearly related to Totonac and some preliminary reconstruction work has been done (Arana, 1953). There have been suggestions that Totonacan is part of a larger group of languages including Mayan and Mixe-Zoque but almost no evidence has yet been published to support the claims.[3]

TT, like other Totonacan languages, is an agglutinative language. The verb system has eleven prefixes, twenty-four suffixes, seven proclitics (four of which occur exclusively with the verb) and two enclitics. Apart from these affixed morphemes, the verb stem may be a compound of two or three morphemes. This naturally provides many possibilities for morphophonemic processes to occur.

TT has a fairly consistent and restrictive syllable structure. The juxtapositions of some morphemes in the verb often create unacceptable syllable structures that must be brought into conformity with the standard pattern through morphophonemic processes. The first part of this paper will include descriptions of such processes and show that they are motivated by the standard syllable structure conditions.

1. The following table presents the distinctive features of the phonemes of TT using the feature system of Chomsky and Halle (1968); /h/, however, is considered [-son] rather that [+son]. Though all vowel phonemes are marked as [+voice] and [-nasal], they may have [-voice] and [+nasal] surface forms.

1. The data for this paper were gathered by my wife and me while living in the Tlachichilco area for seven months and at a workshop in the Fall of 1979 held at the Centro Manuel Gamio in Ixmiquilpan, Hidalgo. The following people made helpful suggestions at various points in the analysis: Doris Bartholomew, Velma Pickett, and David Tuggy. Eunice Pike offered valuable comments and assisted us in learning to "hear" the language. We especially appreciate the detailed comments made by Charles Speck in reading earlier drafts of this paper, and we have greatly profited from discussions with Dorothy Herzog and Herman Aschmann and their knowledge of Huehuetla Tepehua and Totonac, respectively. It should be mentioned, however, that none of these agree with every point in the analysis.

2. Tlachichilco Tepehua is spoken in the municipio of Tlachichilco, Veracruz and in seven surrounding villages. It is difficult to estimate the exact number of speakers of TT but there are probably 700 nuclear families.

3. See McQuown, (1942) and (1956); Wonderly, (1953). More recently, Brown and Witkowski, (1979) have provided evidence for linking Mayan and Zoquean and suggest a further relationship with Totonacan (1978), but provide no evidence for the latter.

Table of Distinctive Features

	p	t	k	q	ɕ	č	s	š	ř	l	m	n	ʔ	h	w	y
cons	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-
syll	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
son	-	-	-	-	-	-	-	-	-	+	+	+	-	-	+	+
cor	-	+	-	-	+	+	+	+	+	+	-	+	-	-	-	-
ant	+	+	-	-	+	-	+	-	+	+	+	+	-	-	-	-
high	-	-	+	-	-	+	-	+	-	-	-	-	-	-	+	+
back	-	-	+	+	-	-	-	-	-	-	-	-	-	-	+	-
round	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
cont	-	-	-	-	-	-	+	+	-	+	-	-	-	+	+	+
nasal	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
strid	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-
del rel	-	-	-	-	+	+			-		-	-	-			
voice	-	-	-	-	-	-	-	-	+	+	+	+	-	-	+	+

The phoneme /ř/ is attested only in Spanish loan words and in a few onomatopoetic words such as /téřu̯/ or /kéři̯/ "frog" and /tikřo:totí/ "wren".

	i	i:	e	e:	a	a:	o	o:	u	u:
cons	-	-	-	-	-	-	-	-	-	-
syll	+	+	+	+	+	+	+	+	+	+
son	+	+	+	+	+	+	+	+	+	+
high	+	+	-	-	-	-	-	-	+	+
back	-	-	-	-	+	+	+	+	+	+
round	-	-	-	-	-	-	+	+	+	+
long	-	+	-	+	-	+	-	+	-	+
nasal	-	-	-	-	-	-	-	-	-	-
voice	+	+	+	+	+	+	+	+	+	+

1.1 Length is contrastive on the vowels:

/šqan/	"fly"	/hun/	"hummingbird"	/ʔawînti/	"over there"
/šqa:n/	"corn husk"	/ʔu:n/	"wind"	/ʔalî:nta/	"there has been"

The low vowel /a/ has positional variants in its long and short forms. The short form of /a/ is realized by [ə] and the long form, /a:/, by [a:]. The long forms of /i/ and /u/ are also pronounced with a slightly higher tongue position than their corresponding short forms, but the contrast is less than that between the positional variants of /a/. In underlying forms, the mid vowels /e/ and /o/ have a much more restricted distribution than the other vowels (see 6 below) and on the surface do not have positional variants in their long and short forms. If we consider the more centralized variants of the three vowels to be [-tense] and the other variants that are closer to the upper and lower extremes of the mouth to be [+tense] we can formulate the following context-free rule:[4]

R1 vowel strengthening $\begin{bmatrix} \alpha\text{high} \\ -\alpha\text{low} \\ +\text{long} \end{bmatrix} \longrightarrow [+\text{tense}]$

However, there is a consistent exception to R1 in that [a] [+tense] occurs as a variant of the short form of /a/ when stressed immediately following a word-initial glottal stop. Thus, we have the following rule:

R2 initial /a/ strengthening $\overset{V}{\begin{bmatrix} +\text{back} \\ -\text{round} \\ +\text{stress} \end{bmatrix}} \longrightarrow [+\text{tense}] \;/\; \#ʔ____$

1.2

1.2.1 Ranking of consonants in this paper is based on three assumptions:

1) those positions in the syllable that are least restrictive in selecting phonemes (i.e., have a larger set of possible "fillers") are the stronger

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4. "Tense" vowels here are not what are often referred to as "tense" vowels in languages such as English. This usage of "tense" does, however, fit the more general descriptions for the term as given in Chomsky and Halle:

> Tense sounds are produced with a deliberate, accurate maximally distinct gesture...One of the differences between tense and lax vowels is that the former are executed with a greater deviation from the neutral or rest position of the vocal tract than are the latter (1968:324).

Aschmann reports for Totonac the same positional variants for long and short forms of /a/ but that "the long vowels (including /i/ and /u/ have a tendency to be produced at a lower tongue position than their corresponding short vowels" (1946:35). Throughout this paper the phonetic distinction between "tense" and "non-tense" forms of the vowels will not be marked in the examples, except where it is necessary to demonstrate a process or rule ordering.

positions; those that are most restrictive are the weaker positions. Thus, for TT, syllable-final position is weaker than syllable-initial position because it has a smaller set of possible fillers;[5]

2) weaker positions have a greater preference for weaker consonants than do stronger positions. Thus, the consonants of rank 8 and 9 occur only in syllable-initial position while [w] occurs only in syllable-final position.

3) the weaker consonants are generally more susceptible to rules of deletion, assimilation, and "weakening processes" than are the stronger consonants.

The application of assumptions 1 and 2 will be seen below in the discussion of standard syllable structure. The application of assumption 3 will be seen at various points in the discussion of rules.

In the ranking chart, all but two phonemes are listed in their basic forms. The continuants /w/ and /l/ have their allophones listed as well, as they are very distinct both phonetically and in their distribution. The surface forms [ƀ] and [ɬ] are determined by their position in the syllable. The glottal stop presents some problems that are discussed in 1.2.2 below.

			s					p		
		y	š	m				t		
	h	[w]	[ɬ]	n	q	(ʔ)	k	[ƀ]	[l]	č	¢
"weak"	1	2	3	4	5	6	7	8	9		"strong"

"low rank of stricture" "high rank of stricture"

This ranking of consonants is, of course, language specific for TT, but, as will be shown, it does present some interesting parallels to both the "rank of stricture" hierarchy of K. L. Pike (1943:56-65, 129-36, 151-56) as developed by E. V. Pike (1954) and the "strong-weak" hierarchy as presented by Hooper (1976:195 ff).

1.2.2 The glottal stop presents some interesting analytical problems in TT, as it does for all the Totonacan languages. As reported by Aschmann, within the syllable, the glottal stop follows the vowel in some dialects, precedes the vowel in others, and in some towns "it actualizes as a laryngealization of the syllabic nucleus without any full glottal stop present" (1946:42). In his analysis of the Totonac of Zapotitlán de Méndez (in which the glottal occurs following the vowel), "the phonetic glottal stop is treated as a part of a vowel nucleus, rather than a separate consonant" (1946:41). The arguments for Aschmann's analysis (restated in part by K. L. Pike, 1967:387) are convincing and are based on the distribution of /ʔ/, its frequency, its occurrence in loans, its effect on the vowel, juncture problems, and the variation of its position in the syllable from one dialect to another.

For several of the same reasons listed by Aschmann for Totonac, it may be

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5. The terms "strong" and "weak" as used in this paper for the most part follow the usage in Hooper (1976, part II). For criteria similar to assumption 1) for ranking positions in the syllable see K. L. Pike and E. V. Pike (1947:80) and Hooper (1976:200).

more insightful to consider /ʔ/ in TT (a dialect where it occurs before the vowel) at least as more closely tied to the nucleus of the syllable than any other consonant.[6] However, this analysis considers the sequence /ʔV/ to be an example of a CV syllable type for two reasons:

1) otherwise it would have to be specified that all syllables which aren't consonant-initial have laryngealized nuclei (this is Aschmann's approach for Totonac, 1946:36);

2) /ʔ/ is phonetically a stop except, as will be shown, when the SSS motivates it to have a different surface form.

2.

2.1 The following syllable types are attested for TT monomorphemic words:

CV	/matîʔi/	"door"	CCV	/lkâka/	"spicy"
CVC	/s̃il/	"mucus"	CCVC	/slul/	"lizard"
CVcC	/tawn/	"one"			

We can describe the standard syllable structure (SSS) of TT in the following manner:

$$\text{Syll.} = +\text{Si:}\begin{cases}\text{CC}\\ \text{C(rank 1-9)}\end{cases}{}^{+}\text{Nuc: V}\ {}^{+}_{-}\text{SF:}\begin{cases}\text{cC}\\ \text{C(rank 1-7)}\end{cases}$$

CC= +sub: C (rank 3) +prin: C(rank 4-9)

cC= +sub: c (rank 2) +prin: C(rank 3-7)

The consonant clusters are posited as containing subordinate and principal constituents for the following reasons:[7]

1) in each case, the subordinate slot has a very restricted set of possible fillers, and,

2) in each case, the possible fillers of the subordinate constituent slot are of lower rank than the possible fillers of the principal constituent slot.

The SSS gives insight to the phonology of TT by providing explanation for the motivation of some rules that will be discussed in the following section.

There are, however, three morphemes and one rule that at times present exceptions to the SSS.

The first person subject (1sub) prefix, k-, may occur before verb stems or prefixes that have a continuant or nasal as the first segment, resulting in the

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6. Cf., Pike's suggestion for Totonac (1947:91). It should be noted here that a series of glottalized stops is reported by Dorothy Herzog for H (personal communication) and by García Ramos for Tajin Totonac (1979:147).

7. It appears that such a model was first used by K. L. Pike and E. V. Pike in their analysis of Mazatec (1947) and is discussed by K. L. Pike (1967:386 ff.).

following forms:

kli:tahun	"I have"	kni:l	"I died"
kmil	"I came"	ksa:l	"I hit him"

Often, however, in casual speech the prefix is not present in these forms (thus conforming to the SSS) and 1sub is understood from the context:

a) tawánanča t?at?i "when did you come?
   mil kutanča "I came yesterday"
b) li:miná: "I'll bring it"

The response form in a) is understood as 1sub by the context. The verb in b) is readily understood as 1sub because only 1sub has the option of not taking the proclitic ka- ("irrealis") when the future tense suffix, -ya: is present.

Immediately preceding a nonnasal stop, k- is obligatorily deleted unless it follows a vowel or nasal or the (uncommon) alternate form for 1sub, ?ik-, is used.[8] (In such cases the syllable boundary is interpreted as coming after k- and the forms thus pattern after the SSS). The rule accounting for the deletion of k- is discussed in 2.2 R4, below. The following forms display the resultant ambiguity of subject in some surface forms (an ambiguity usually resolved by the context):

		foc	
te?en	"he goes on"	wa:≠kte?en	"I go on"
	or "I go on"	wa:≠te?en	"he goes on"
		irr	
pastakli	"he thought"	ka≠kpastakli	"that I may think"
	or "I thought"	ka≠pastakli	"that he may think"

The prefixes ?ukš- (body part prefix from ukšpú:, "face" or úkšni, "top of head"?) and ?aqš- (numeral classifier for counting flat objects) present exceptions to the SSS when they are prefixed to a morpheme that begins with /ɕ/:

"face" + "a little"
?ukš + ɕ?uníy → ?uksɕ?uníy "near"

"cl:flat object" + "eight"
?aqš + ɕahín → ?aqsɕahín

In addition to the forms above there are exceptions to the SSS which result from the application of R20 optional deletion (see 3.2 below):

"1poss≠mother≠plposs"
kin≠nati≠k?an → [kinatk?án~kinatik?án]
"our mother"

"one≠already day
tawn≠ča ɬulčán → [tawnčhulčán~tawnčahulčán]
"already one day"

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8. This TT alternate is the basic form for 1sub in H.

The exceptions to the SSS in TT might suggest the positing of a tentative "non-standard syllable structure":

	C	C	C	V	c	C	C
Rank	3	4-9	4		2	4	4-9

It should be noted, however, that without exception all monomorphonemic words (though often polysyllabic), when pronounced in isolation, conform to the SSS.

The basic difference between the system of consonant ranking used by Hooper and that used by E. V. Pike is that Pike's rank of stricture has a purely physiological-articulatory basis while Hooper considers "the syllable, and for that matter the cover feature strength, as theoretical constructs, not entirely divorced from physical reality" (198).[9] The strong-weak hierarchy of consonants presented by Hooper is primarily based on the vowel-likeness of the consonants (199). Those consonants that have a greater number of features in common with vowels (voicing, continuantness, sonorantness) are weaker and those most unlike vowels are stronger. E. V. Pike's system of rank of stricture has some parallels since she includes the degree of stricture as a determining factor; e.g., /t/ would be expected to have a higher rank of stricture than /s/. Pike, however, also takes into account the place of articulation, first considering the cavity in which the stricture occurs (oral being primary, nasal secondary, and pharyngeal tertiary), and secondly the position of the stricture within the cavity. Pike's "Criterion 5" states that

> When both of two segments have strictures in the oral cavity and the strictures are of the same degree of closure, then the segment which contains the stricture farthest toward the front of the mouth is of higher rank than the other. For example, /f/ outranks /s/; /t/ outranks /k/ (1954:27).[10]

Thus, for TT, /p/ and /t/ are ranked above /k/, and /k/ is ranked above /q/ (though in TT /p/ is not ranked above /t/).

Such a ranking of consonants by place of articulation in the oral cavity seems to be valid for TT and appears to be valid for other languages as well.[11]

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9. For a criticism of Hooper's "avoidance of articulatory considerations" see A. Brakel (1979).

10. It is interesting to note that Pike's article is not recognized in the current discussions of syllable structure and consonant strength in the literature, though much of what is being said now echoes her insights made well over two decades ago.

11. Southern Nambiquara has no labials in syllable-final position (Price, 1976: 345); Arekuna allows only /k/ and nasals in syllable-final position (Edwards, 1978:227); weakening in word-final position has been reported in Chinese that perfectly parallels E. V. Pike's system of ranking (Chen, as reported in Hyman, 1975:168; see also Foley's ranking of consonants to explain shifts in Spanish and German as reported in Hyman, ibid.); and Venneman (in Hooper, 1976:196) posits a ranking of consonants for Modern Icelandic in which /t/ is ranked above /k/ (but also above /p/). It is important to note however that all seem agreed that probably no phonological system can be accounted for solely in terms of its syllable structure and strength of consonants, though such considerations often

As stated previously, the SSS for TT permits /ȼ/, /č̃/, /p/, and /t/ to occur only in syllable-initial position. Such a restriction on the affricates /ȼ/ and /č̃/ could be predicted by either the strong-weak hierarchy of Hooper or the stricture ranking of Pike. However, only Pike's system would predict such a restriction on /p/ and /t/ that is not also applicable to /k/ and /q/. As the stops closer to the front of the mouth are considered to be of a higher rank than the stops toward the back of the mouth, they would be considered more likely to be restricted to the stronger position of the syllable, i.e., syllable-initial (see 2.2 R12, below.

2.2 There are several rules in TT that are motivated by the SSS.

In all other Totonacan dialects (including PF and H) the voiceless lateral /ɬ/ has phonemic status. In TT the occurrence of [ɬ] is predictable according to the following rule:

R3 /l/ devoicing [12] $l \rightarrow \begin{bmatrix} -\text{voice} \\ -\text{son} \end{bmatrix} / ____ \begin{Bmatrix} \$ \\ C \end{Bmatrix}$

/lman/	[ɬmą]	"wide"
/tálpa/	[taɬpą]	"cliff"
/púlʔan/	[púɬʔą]	"mud"
/wil/	[ƀiɬ]	"he sits"
/ta-wila-nal/	[taƀilánaɬ]	"they sit"
/ltatáy/	[ɬtatay]	"he sleeps"
/talmán/	[taɬmą́]	"tall"
/qallúh/	[qaɬlúh]	"a lot of plants"

Rule three states that /l/ is devoiced syllable-final or preceding a consonant. However, according to the present analysis it is more insightful (though notational conventions are lacking) to state that /l/ is devoiced when in syllable-final position or when it is the subordinate constituent of a consonant cluster. Ssuch a description shows the motivation for the devoicing: when /l/ occurs in a weaker position in the syllable, it occurs in its weaker form. The voicelessness of the /l/ can't be accounted for adequately by the presence of a following consonant since the following consonant is sometimes voiced; it would be difficult to understand why a voiced C would cause /l/ to devoice. Therefore, it is more likely that the /l/ is conditioned by its position rather than by the surrounding phonemes; and the fact that syllable-final position (which is considered to be a weak position) permits /l/ only in its voiceless form suggests that [ɬ] is weaker than [l] in TT.

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provide much added insight (E. V. Pike, 1954:41; Hyman, 1975:168; and Hooper, 1976:194). See Hyman (ibid.) for examples of languages where Pike's physiological system of ranking as discussed here apparently is not reflected in the phonology.

12. The occurrence of [ɬ] is predictable in Tierra Colorada, and, for the most part in the other villages of the Tlachichilco area. However, in two larger villages, some speakers retain the contrast between [ɬ] and [l] preceding vowels. However, in such cases, and in other Totonacan language groups that retain the contrast, only /ɬ/ may occur syllable-final and preceding a consonant, and so would be similarly ranked as weaker than /l/.

This assumes, following Pike's system of rank, that [ɬ] should be ranked below [l]. In Pike's system a voiced continuant is ranked above a voiceless continuant because the former has an additional stricture (the glottis). Hooper's criterion for consonant ranking (i.e., vowel-likeness) causes her to rank voiceless consonants as stronger than their voiced counterparts.[13]

Another criterion would also cause Hooper to rank [ɬ] as stronger than [l] in TT. When Hooper deals with word-initial clusters such as /st/, /sp/, etc. in English, she considers the first position to be stronger because it occurs further from the syllable nucleus.[14] The analysis would be similar for clusters such as [ɬp], [ɬt], etc. in TT. However, in English, as Hooper explains, there remains the difficulty of how to handle word-final clusters such as /st/, /sp/, etc., where /s/, being closer to the nucleus, must be considered to be weaker (218). A similar problem would be encountered in applying Hooper's criteria to TT. In word-initial consonant clusters, [ɬ] would have to be considered as stronger than [l] as only [ɬ] can occupy the first position in such clusters; and, as already mentioned, Hooper considers the position furthest from the syllable nucleus to be the strongest. However, the fact that in all Totonacan languages [l] may not occur in syllable-final position (a weak position) though [ɬ] often does, suggests the opposite: That [ɬ] is weaker than [l].

We don't encounter this problem in an analysis which posits subordinate and principal constituents of consonant clusters because the position which is farther from the nucleus is not necessarily the stronger position. [ɬ] is considered to be weaker than [l] both by the occurrence of [ɬ] in consonant clusters and by its occurrence in syllable-final position: in the former it is the subordinate (weaker) constituent of the cluster and in the latter it occurs in a weak position in the syllable.[15]

The SSS in TT does not permit a sequence of two stops within the same syllable. Often, however, there are underlying forms that have such sequences.

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13. It is usually assumed (as in Hooper, 1976) that voiceless consonants are stronger than (ranked above) their voiced counterparts. Braker argues that "the ubiquity of voice in human communication suggests that impediments or deviations from this state represent markedness--the greater the deviation...the greater the strength or the markedness of the segments involved" (1979:45). Yet, as Hyman points out, "by far the most common weakening process is devoicing" (1975:168). This analysis follows Pike's ranking of voiced segments as stronger than their voiceless counterparts; but I would also point out that in a voiced environment, such as intervocalically, it would be expected that a voiced segment would usually be considered as weaker than its voiceless counterpart in the same environment (E. V. Pike, personal communication). In the case of TT [ɬ] and [l], however, it appears that only the position in the syllable determines the surface form and that the voicing of the environment has no effect.

14. "If the syllable is viewed as a unit whose center is the most vowel-like and whose outer margins are the least vowel-like, then it is reasonable to speculate further that any intervening segments will be intermediate between least and most vowel-like" (1976:199). It will be recalled that for Hooper the "most vowel-like" sounds are the weakest.

15. Similarly in English, /s/ would be considered the weaker constituent in consonant clusters such as /sp/, /st/, etc., whether that cluster is syllable-initial or syllable-final.

R4-R7 below, modify the underlying form to conform to the SSS.

As mentioned in 2.1 above, the 1sub marker, k-, is optionally deleted when preceding a consonant in the same syllable and obligatorily deleted if that consonant is a non-nasal stop:

R4 optional /k-/ deletion: /k/ → Ø / _____ { [-cont] [+nas] / [+cont] }

condition: syllable-bound optional

R5 obligatory /k-/ deletion: /k/ → Ø / _____ [+cons -son -cont]

condition: syllable-bound

The following examples show the resultant ambiguity in some surface forms:

	I+come+pt	foc+I=come+pt	irr+I+hit+pt	I+hit+pt
UF	$k+min+li	wa:+k$+min+li	ka+k$+sa:+li	$k+sa:+li
R4	minli	-----	-----	sa:li
	...	...	...	...
surf	miɬ	wa:kmíɬ	kaksá:ɬ	sa:ɬ
	(=I came, he came)	(=I came)	(=that I may hit him)	(=I hit him, he hit him)

	neg≠1sub≠plant+fut	plant+fut	neg≠1sub≠think+pt	1sub≠think+pt
UF	sin≠k$≠č?an+ya:	$k≠č?an+ya:	ha:ntu≠k$≠pastak+li	$k≠pastak+li
R5	----	č?anya:	----	pastakli
	...	...	...	...
surf	sinkčaná:	čaná:	ha:ntukpastákɬi	pastákɬi̯
	(=I won't plant)	(=I will plant)[16]	(=I didn't think)	(=I/he thought)

When a verb stem is /w/-initial, R15 /w/ strengthening (see below) strengthens the semi-vowel /w/ to the consonant [ƀ]. When [ƀ] is preceded by the 1sub marker, k-, it is devoiced as in R6 [ƀ] devoicing, below; then k- is deleted (in normal speech) as in R4, above:

R6 [ƀ] devoicing: ƀ --→ pʷ / [-voice] _____

condition: syllable, bound

16. This in interpreted as 1sub since only 1sub may take the "fut" suffix, -ya:, without the "irr" proclitic, ka-, as mentioned above in 2.1.

	1sub≠become+pt	become+pt	1sub≠sit+pt	sit+pt	3plobj+feed+pr
UF	k≠wa:+li	wa:+li	k≠wila+li	wila+li	lak$+wa:wa:+ya
R15	kƀa:li	ƀa:li	kƀilali	ƀilali	lakƀa:ƀa:ya
R6	kp^{w}a:li	----	kp^{w}ilali	----	----
R4	p^{w}a:li	----	p^{w}ilali	----	----
	...	...	...	...	...
surf	p^{w}a:ɬ	ƀa:ɬ	p^{w}iɬ	ƀiɬ	lakƀa:ƀá:y

	1sub≠feed+pr	feed+pr	1sub≠eat+pt	eat+pt
UF	k≠wa:wa:+ya	wa:wa:+ya	k≠wahin+li	wahin+li
R15	kƀa:ƀa:ya	ƀa:ƀa:ya	kƀahinli	ƀahinli
R6	kp^{w}a:ƀa:ya	----	kp^{w}ahinli	----
R4	p^{w}a:ƀa:ya	----	p^{w}ahinli	----
	...	...	...	...
surf	p^{w}a:ƀá:y	ƀa:ƀá:y	p^{w}áyɬ	ƀáyɬ

Thus, the surface contrast between 1sub and 3sub is displaced: rather than being marked by the presence vs. absence of k-, it is marked by the voiceless and voiced allophones, [p^{w}] and [ƀ], (the former marking the presence of k- in the underlying form).

When followed by /ʔ/ within the same syllable, /q/ or /h/ is deleted:

R7 /q,h/ deletion $\begin{bmatrix}-\text{syll}\\-\text{high}\\-\text{ant}\end{bmatrix} \rightarrow \emptyset \;/\; ____ \begin{bmatrix}-\text{cons}\\-\text{cont}\end{bmatrix}$

condition: syllable-bound

	play+pr+2sub	is+pr+2sub	see+go	hand+nail
UF	qamanan+ya+R25	tahun+ya+R25	laq$+ʔan	mah$+ʔésiːti
R25	$qʔamananya	ta$hʔunya	----	----
R7	ʔamananya	taʔunya	----	----
	...	...	...	...
surf	ʔamaná	taʔú	laqʔá	mahʔésiːtị

When /ʔ/ is immediately preceded by a stop within the same syllable, it is realized as laryngealization of the following vowel:

R8 V-lar coalescence $\begin{bmatrix}-\text{cont}\end{bmatrix}\begin{bmatrix}-\text{cont}\\-\text{cons}\end{bmatrix} V \Longrightarrow 1 \;\; \emptyset \;\; 3$

1 2 3 $\quad\quad$ [+lar]

condition: syllable-bound

	chile	sell+pr	jail	3plobj+eat+pr
UF	$p?in	$st?a:+ya	pa:$č?ín	lak$+?u+ya
R8	pi̯n	sta̯ya	pa:čin	----
	...	...	...	...
surf	pi̯	sta̯y	pa:či̯	lak?úy

Two other rules should be mentioned here that are limited to verb forms with 1sub.

First, for all /h/-initial verb stems, the /h/ is deleted when preceded by the 1sub marker, k-:

R9 Stem initial /h/ deletion /h/ → Ø/ /k-/ + _____

	3sub+say+pt	1sub≠say+pt	3sub+lead+pt	1sub≠lead+pt
UF	Ø+hu:ni:li	k≠hu:ni+li	Ø+hap?ula+li	k≠hap?ula+li
R9	----	ku:nili	----	kap?ulali
surf	hú:niɬ	kú:niɬ	hapu̯laɬ	kapu̯laɬ

Second, the 1sub marker k- becomes hk- if it is immediately preceded and followed by a vowel. Such an environment occurs only when k- follows a V-final clitic and immediately precedes an underlying /?/ initial or /h/ initial verb stem to which R8 or R9 have been applied:

R10 /h/ insertion Ø → h /V≠____k≠V

	foc≠1sub+say+pt	irr≠1sub≠go+fut	pst≠1sub≠eat+pr
UF	wa:≠k+hu:ni+li	ka≠k≠?an+ya:	?iš≠k≠?u:+ya
			...
R8	----	kaka̯nya:	?išaku̯:ya
R9	wa:ku:nili	----	----
R10	wa:hku:nili	kahka̯nya:	?išahku̯:ya
	...	...	...
surf	ƀa:hkú:niɬ	kahka̯ná:	šahku̯:y

As stated above, the SSS does not permit /p/ or /t/ to occur in syllable-final position. However, there are several nouns and verb roots that have a final /p/ or /t/ in their underlying forms. When these forms are followed by a vowel-initial suffix, the /p/ or /t/ is interpreted as syllable-initial and the phonemic form is identical to the morphophonemic form. However, when they are followed by consonant-initial suffixes the /p/ or /t/ must be interpreted as syllable-final; and when in syllable-final position the following two rules change the /p/ into /wk/ or /k/ and the /t/ into /k/, resulting in forms that conform to the SSS:

R11 rounding $\emptyset \rightarrow w / \begin{bmatrix} V \\ +back \\ -round \end{bmatrix}$ _____ p$

R12 /p,t/ weakening $\left\{\begin{matrix}p\\t\end{matrix}\right\}$ -→ k / ____ $

taliɕúkuti	"animal"	qasmáta	"he hears it"
taliɕukúkna	"animals"	qasmákɬi	"he heard it"
čánkati	"sugarcane"	kápa	"he forgets it"
čankákna	"sugarcanes"	káwkɬi	"he forgot it"
hóʔati	"man"	šápa	"he pants"
hoʔákna	"men"	šáwkɬi	"he panted"[17]

Nasals are weakened in syllable-final position, resulting in neutralization of contrast between /m/ and /n/ as in the following two rules:

R13 V-nasal coalescence V $\underset{1}{[+\text{nasal}]}\ \underset{2}{\left\{\begin{matrix}[-\text{cons}]\\[-\text{son}]\\\#\#\end{matrix}\right\}}\ \underset{3}{}$ ==⇒ $\underset{1}{[+\text{nasal}]}\ \underset{}{\emptyset}\ \underset{3}{}$

R14 nasal assimilation $\begin{bmatrix}+\text{cons}\\+\text{nasal}\end{bmatrix}$ -→ $[\alpha\text{pt. of art.}]$ / ____ $[\alpha\text{pt. of art.}]$

In R13, a vowel-nasal sequence is realized as a portmanteau nasalized vowel preceding /ʔ/ or /h/ or when phrase-final. Otherwise (R14), a nasal consonant has the same point of articulation as the following consonant.

taqanʔáy	[taqąʔáy]	"sick"
tačʔa:nhú:y	[tačą:hú:y]	"he sticks his foot in it"
tʔu:n	[tṷ:]	"land"
čun	[čṷ]	"yes"
ʔišpá:n Pé:yah	[ʔišpá:mpé:yah]	"Peya's bread"
tawm	[taw]	"one" (cf., tawmí "ones")

17. These are as yet the only attested verb roots having an underlying form that ends in /p/. However, the TT pronunciation of the Spanish cápsula (capsule) is káwksula, and septiembre (September) is sektiyémbre. In a test of a few Spanish forms that have syllable-final /p/ (there are relatively few), the TT pronunciation conformed to the above rule; e.g., Sp:núpcial, TT:núksial; Sp:óptica, TT:ʔóktika; Sp:réptil, TT:réktiɬ; and, Pepsi, TT:péksi, a form which is also common in Mexican Spanish. Some Aztec place-names with /tl/ are interpreted by speakers of TT as having a syllable-final /t/, so the /t/-→/k/; e.g., Huayacocotla, TT:/wayakokókla/ and Huehuetla, TT:/wewékla/. There is also evidence for such a process historically: Totonac and H: nípši, "squash", TT:níwkši or nikši; and Totonac and H: qʔotá:, "he will drink it", qʔótɬi, "he drank it"; TT: ʔotá: and ʔóqɬi. These last two forms present a minor exception to the rule (where t-→q rather than the expected t-→K; cf., also ɕóqli, "he wrote it" and ɕotá:, "he will write it"). Nevertheless, the same principle of conforming to the SSS applies (see fn.27, below). It should be noted, however, that the village of Tecomajapa, which is usually included within the Tlachichilco dialect area does allow syllable-final /p/ and /t/ (thus, nipši, "squash").

ɕanqáy	[ɕaŋqáy]	"he lacks"
ɕ?an?áy	[ɕa̰?áy]	"you lack"

In syllable-initial position /w/ is strengthened:

R15 /w/ strengthening w -→ ƀ / _____ V

Such a process might be analysed as a weakening of /ƀ/ in syllable-final position; however, the above analysis is preferred for two reasons:

1) this provides a greater simplicity in the feature system of the underlying phonemes, and,

2) in several Totonacan dialects this phoneme is pronounced in its weaker form, [w] , only, in both syllable-initial and syllable-final positions.

	ten	ten+pl	int+sit+pr[18]	sit+pr
UF	ka:w	ka:w+ín	ta+wila+ya	wila+ya
			...	...
R14	---	ka:ƀín		ƀilaya
	...	...	...	...
surf	ka:w	ka:ƀḭ́	tawláy	ƀił

Except in markedly slow speech, /h/ never occurs before a nonstressed vowel in TT. Therefore we have the following rule:

R16 /h/ deletion h -→ Ø / V_____ V [-stress]

As stated in the SSS, there are no vowel clusters in TT. As a result of R16 above, however, two vowels are often juxtaposed in a derivation. In such instances the second vowel becomes a semivowel, or if the two vowels are identical, one long vowel results:

R17 V lengthening $V_i\ V_i$ ==→ [+long] Ø (1) (1 2)

R18 desyllabification V -→ [-syll] / V_____

R17 must be ordered before R18 to give the following forms:

---

18. The underlying form for sit is /wila/. In the stative, singular forms the final /a/ is dropped, while in its intransitive forms (following ta-) plural and singular, the /i/ is deleted. The full form thus occurs only in the stative plural forms: wilanáw, "we sit"; wilanant?ḭk "you (pl) sit"; tawilanal "they sit".

	irr≠become+fut[19]	irr≠jump+ben+pt
UF	ka≠hun+ya:	ka≠hak?iyuk+ni+li
	...	
	kuhunya:	
R16	kuunya:	----
R17	ku:nya:	----
R18	----	----
	...	...
surf	ku:ná:	ka:k?íyúknił

	is+pr+1pl	irr≠eat+fut
UF	tahun+ya+wi	ka≠wahin+ya:
R16	taunyawi	kawainya:
R17	----	----
R18	tawnyawi	kawaynya:
	...	...
surf	tawná:w	kaɓayná:

3.

3.1 Each word in TT has one stressed syllable. In polysyllabic words all pre-stress syllables are mid-pitch and the stressed and post-stress syllables are high-pitch (unless preceding pause[20]). However, in normal and fast speech, word boundaries are often deleted. When a boundary between two words is deleted, the stressed syllables retain their stress, but the intonation patterns as one word with high pitch falling only on the last stressed syllable. When a word boundary is deleted a clitic boundary remains in its place. The following are examples of alternate pronunciations of phrases at varying speeds:

19. The derivation of this form and how ka- → ku- is discussed in section 6., below.

20. The two most common types of pre-pause intonation are statement and question. Statement intonation is marked by 1) a downglide from high to low on the stressed syllable if the stressed syllable is the final voiced syllable, or, 2) a high pitch on the stressed syllable and low pitch on the post-stress syllable(s). Question intonation is marked by high pitch on pre-stress syllables and a low pitch on the stressed syllable and any voiced post-stress syllable(s):

statement pre-pause	#táwnčhułčą́:#há:ntkụbáytštikšúyaił##	"he went a day without food"
(allegro)	#ča:ná:há:ka##	"a ripe banana"
question pre-pause	#táwnčhułčą́:#há:ntkụbáytštikšúyaił##	"did he go a day without food?"
(allegro)	#ča:na:há:ka##	"a ripe banana?"

one≠ day neg with≠eat+nm pst≠wander+pt
/táwn≠ča hulčán há:ntu kun≠wáy+ti ʔiš≠tikšú:ya+li/
"he went a day without food"

largo #táwnčą#hułčą̣ #há:ntų#kụbáytị#ʔištikšú:yał
andante #táwnčhułčą̣ #há:ntkụbáytị #štikšú:yał#21
táwnčahułčą̣ há:ntukụbáytị štikšú:yał
allegro #táwnčhułčą̣ #há:ntkụbáytštikšú:yał#
táwnčahułčą̣ há:ntukụbáytištikšú:yał
presto #táwnčhułčą̣ há:ntkụbáytštikšú:yał#

3poss≠face hand "palm" /ʔiš≠ʔukšpu:·maka:/
andante #ʔišʔukšpú?#maká?#
allegro #šʔukšpu:maká?#

ripe banana /ča:ná: ha:ka/
#ča:ná?#há:ką̣#
#ča:ná:há:ką̣#

3.2 The five rules discussed in this section refer to clitic-final or word-final segments.

R19 word-final devoicing
$$\begin{matrix} C & (C) & V & & & & 3 & \\ [-\text{voice}] & & [-\text{stress}] & \# & \Longrightarrow & 1\ (2) & [-\text{voice}] & 4 \\ 1 & 2 & 3 & 4 & & & & \end{matrix}$$

When word-final and following a voiceless consonant, an unstressed vowel or a sequence of a consonant followed by an unstressed vowel is devoiced. R19 is ordered after R3 /l/ devoicing (feeding order) and after R24 stress placement:[22]

	bathe+1pl	bathe+1pl≠already	light	3poss≠light≠plposs
UF	paš+wi	paš+wi≠ča	máklku	ʔiš≠maklku≠kʔán
	...	...		
R19	pášp̥i	pášbič̥a	mákɬkų̣	----
				...
surf	pášp̥i	pášbič̥a	mákɬkų̣	šmaklkukʔą̣

21. See section 5. for explanation of variant forms of ʔiš-.

22. Following a voiced consonant, no unstressed vowels occur on the surface preceding a clitic, word or phrase boundary (see R19); so no such examples of nonapplication of R19 can be given.

	pig	3poss≠pig≠plposs	beans	3poss≠beans≠plposs
UF	pʔášni	ʔiš≠pʔašni≠kʔán	stápu	ʔiš≠stapu≠kʔán
R19	pʔáš̩n̩i	----	stápu̯	----
	...	...		...
surf	pʔáš̩n̩i	špʔášnikʔą́	stápu̯	ʔistapukʔą́

	mother	3poss≠mother≠plposs	rest+pt	rest+pt≠already
UF	náti	ʔiš≠nati≠kʔán	stak+li	stak+li≠ča
			...	...
R19	náti̯	----	stákɬi̯	stákličą
		...		
surf	náti̯	šnatikʔą́	stákɬi̯	stákličą

	star	3poss≠ star ≠plposs	tropical fruit	3poss≠tr.fruit≠plposs
UF	stákʔu	ʔiš≠stakʔu≠kʔán	páqlma	ʔiš≠paqlma≠kʔán
			...	...
R19	stákʔu̯	----	páqɬm̩a̯	----
	...	...		...
surf	stákʔu̯	ʔistakʔukʔą́	páqɬm̩a̯	špaqɬmakʔą́

When unstressed and clitic-final and following a voiceless consonant, a stop-vowel sequence or a vowel is optionally deleted:

R20 optional deletion

	C	C	V						
[-voice]	[-cont]	[-stress]	≠ C	==⇒	1	Ø	Ø	4	5
1	2	3	4 5						

condition: optional

a) /pʔašni ɬatáy/ [pašɬatáy] "pig is sleeping"
[pašniɬatáy]

b) /híkmi ¢ásta/ [hik¢ásta] "the fire is hot"
[hikmi¢ásta]

c) /ki:n≠paqlma≠kʔán/ [ki:mpaqɬkʔą́] "our fruit"
[ki:mpaqɬmakʔą́]

d) /máklku míntača/ [makɬmintačą] "a light is coming
[makɬkumíntačą]
*[makɬmíntčą]

e) /pa:stákʔa≠ča/ [pa:stákʔačą] "he's thinking now"
*[pa:stakčą]

f) /pášli≠ča/ [pášličą] "he already bathed"
*[pašɬčą]

g) /tawnča huɬčá:n/ [tawnčhuɬčą́:] "already one day"
[tawnčahuɬčą́:]

(See also the examples under 3.1.)

As can be seen in c) and d) above, R20 is ordered after R3 /l/ devoicing (a feeding order). Also, as noted in examples d-f above, there is a minor exception to R20 in that it may not apply before the clitic /-čа/, "now, already". The clitic /-čа/ may itself be contracted to [č], however, as in example g), above. /-čа/ is marked [-context R20] in the lexicon.

All word-final stressed vowels on the surface are [-long] and phonetically closed by a glottal stop. The only syllable which may terminate in a glottal stop is the final syllable of the word:

R21 word-final glottal: $\overset{V}{[+\text{stress}]}_1 \; \#_2 \Longrightarrow 1 \; ? \; 2$ / $[-\text{long}]$

That R21 is ordered after R1 vowel strengthening (a non-bleeding order) is shown in the following examples:

	irr≠come+fut	tomorrow≠yet	house	father-in-law
UF	kə≠min+ya:	li:y≠ká:	čəqə́:	əpə:nə́
R1	kəminyá:	li:yká:	čəqá:	apa:nə́
R21	kəminyá?	li:yká?	čəqá?	apa:nə́?
	...			...
surf	kəminá?	li:yká?	čəqá?	apa:nə́?

An unstressed vowel is deleted when preceded by a vowel-sonorant sequence and followed by a clitic boundary:

R22 V deletion: $\overset{V}{[-\text{stress}]} \rightarrow \emptyset \; / \; V \; [+\text{son}] \; ____ \neq$

This rule is most clearly applicable to the verbal suffixes /-li/ "pt", /-wi/ "1pl", and /-ya/ "pr", though, as will be seen, it also accounts for a step in the derivation of 2sgsub,pt for some forms. Elsewhere in TT such a sequence does not occur. R22 is ordered before R15 /w/ strengthening (bleeding)[23], before R3 /l/ devoicing (feeding order), and after R24 stress placement:

	pay+pt	write+pt	pay+1pl	write+1pl
UF	mapala+li	ɸoq+li	mapala+wi	ɸoq+wi
R24	mapaláli	ɸóqli	mapaláwi	ɸóqwi
R22	mapalál	----	mapaláw	----
R15	----	----	----	ɸóqβi
R3	mapaláɬ	----	----	----
	...	...	...	...
surf	mapálaɬ	ɸóqɬi̥	mapaláw	ɸóqβi̥

23. It should be noted that though this is a bleeding order, the reverse order (R15 before R22) is also bleeding. What is interesting, however, is that the required order minimizes rather than maximizes the paradigmatic uniformity.

	enter+pr	bathe+pr	bathe+pr+1pl	bathe+1pl
UF	tanu:+ya	paš+ya	paš+ya+wi	paš+wi
R24	tanú:ya	pášya	pašyáwi	pášwi
R22	tanú:y	----	pašyáw	----
R15		----	----	pášbi
		...	...	...
surf	tanú:y	pášą	pašáw	pášpį

The following optional rule completely or partially devoices /y/ and /w/ when word-final:[24]

R23 /w,y/ devoicing $\begin{bmatrix}-\text{cons}\\-\text{syll}\\+\text{son}\end{bmatrix}$ --> [-voice] / ____#

condition: optional

a) /ša:y/ [ša:y ~ ša:yy̥ ~ ša:y̥] "good afternoon"

b) /ʔapálay/ [ʔapálay ~ ʔapálayy̥ ~ ʔapálay̥] "more"

c) /šapáy/ [šapáy ~ šapáyy̥ ~ šapáy̥] "old man"

d) /kaw/ [kaw ~ kaww̥ ~ kaw̥] "ten"

e) /łpaw/ [łpaw ~ łpaww̥ ~ łpaw̥] "avocado"

---

24. Unfortunately, the rule, as stated, does not account for the partially devoiced forms. This is, of course, a result of using only binary features. With such a restriction the partially devoiced forms could still be accounted for by the following rules (suggested by Doris Bartholomew):

a) $\emptyset \rightarrow \begin{bmatrix}-\text{cons}\\-\text{syll}\\-\text{voice}\\+\text{high}\\\alpha\text{back}\\\beta\text{round}\end{bmatrix} / \begin{bmatrix}-\text{cons}\\-\text{syll}\\+\text{high}\\\alpha\text{back}\\\beta\text{round}\end{bmatrix}$ ____ #

condition: optional

b) $\begin{bmatrix}-\text{cons}\\-\text{syll}\\+\text{voice}\end{bmatrix}$ --> $\emptyset$ / ____ $\begin{bmatrix}-\text{cons}\\-\text{syll}\\-\text{voice}\\+\text{high}\end{bmatrix}$ #

condition: optional

Applied in the order given, a) would produce the partially devoiced forms (-yy̥ and -ww̥) and b) would then produce the fully devoiced forms. However, such an approach seems to be very ad hoc and a better solution would probably be found in the use of multivalued features.

f) /kaminάwi/ [kaminάw ~ kaminάww ~ kaminάw] "we come"

g) /taštúya/ [taštúy ~ taštúyy ~ taštúy] "he goes out"

It can be seen in f) and g) above, that R23 is ordered after R22 V deletion.

An interesting note regarding the rules in this section (R19-23) is that none of them apply in what could be called a "calling" speech style, which is also marked by a substantial lengthening of the final vowel:

standard speech	calling	gloss
mapaláw	mapalábi::	"we paid"
mapálał	mapálali::	"he paid"
mapaláy	mapaláya::	"he pays"
kinčaqáʔ	kinčaqá::	"my house"
kamináʔ	kaminá::	"he'll come"
mimákłku	mimákłku::	"your light"
pášłi	pášli::	"he bathed"
pášpi	pášbi::	"we bathed"

4. There are a number of rules in TT that apply only to the verb. Some of these are restricted to the verb because only there are the conditions met for their application; others must be formally stated as restricted to the verb. In this section a few rules of both types are presented.

While there is no consistent placement of stress on other parts of speech, stress occurs on the verb according to the following rule:

R24 stress placement

$$V \rightarrow [+\text{stress}] \;/\; ____ \left([+\text{cont}]\right) C_0 \left(\begin{bmatrix} V \\ -\text{long} \end{bmatrix}\right)\left([-\text{cont}]\right)\neq \Big]_{\text{verb}}$$

A vowel is stressed when it is separated from the clitic boundary by a following syllable and the following syllable a) contains a short vowel and is closed by a noncontinuant, or, b) is an open syllable with a short vowel. If it is in a syllable immediately preceding the clitic boundary, a vowel is stressed a) when it is followed by a continuant, and/or, b) when it is [+long].

lakʔapʔupʔíntʔik	"you (pl) believed it"
kaʔuya:pʔítʔik	"you (pl) will eat it"
lakamínta	"he is looking this way"
kiʔaqtʔayʔú:tʔi	"help me!"
qamanán	"he plays"
mapáláy	"he pays him"
kala:čiwiniyá:w	"we will talk together"
kataʔančoqoyá:	"they will go back"
kamilpayá:	"he will sing"
pa:stákʔaʔča	"he thinks"

There are two rules that are restricted to the second person forms of the verb. Where applicable the following rule marks verbs for second person subject (2sub), whether singular or plural:[25]

R25 2sub lar $\emptyset \rightarrow$ ʔ / $\left\{\begin{bmatrix}-\text{cont}\end{bmatrix}\right.$ $\left.\begin{bmatrix}-\text{cons}\\+\text{cont}\\-\text{son}\end{bmatrix}\right\}$ ____ V] verb [+2sub]

condition: clitic bound

When the subject is second person, /ʔ/ is inserted immediately after all pre-vocalic stops and pre-vocalic /h/s, except those that occur in clitics. R25 is iterative and is ordered before R7 /q,h/ deletion and before R8 V-lar coalescence (both feeding orders):

	lack+pr+2sub	3sub+lack+pr	is+pr+2sub	3sub+is+pr
UF	ɬanqa+ya	Ø+ɬanqa+ya	tahun+ya	Ø+tahun+ya
R25	ɬʔanqʔaya	----	tʔahʔunya	----
R7	ɬʔanʔay	----	tʔaʔunya	----
R8	ɬa̰nʔay	----	ta̰ʔunya	----
	...	...	...	...
surf	ɬa̰ʔa̰y	ɬaŋqa̰y	ta̰ʔṵ́	tahṵ́

	think+pr+2sub	see+pr+2sub	1obj≠ help +2sub,pt
UF	pa:stak+ya	laqɬʔin+ya	kin≠ʔaqtayhuy+tʔi
R25	pʔa:stʔakʔa	----	kinʔaqtʔayhʔuytʔi
R7	----	----	kinʔaqtʔayʔuytʔi
R8	pa̰:sta̰ka̰	laqɬ̰inya	kinʔaqta̰yʔuytḭ
	...	...	...
surf	pa̰:sta̰ka̰	laqɬ̰ḭ	kiʔaqteyʔutḭ
	(cf. **pa:staka̰**, "he thinks")	(cf. laqɬ̰ḭ, "he sees it")	

The [+pt], 2sub form of the verb, besides often being marked by laryngealization, is marked by the following rule where applicable and otherwise by the suffix -tʔi:

R26 2sub /n/ deletion n-→ $\emptyset$ / + $C_1VC_0(C_1VC_0)_1$ ____ #] verb [+2sgsub] [+pt]
stem

In the punctiliar form of the verb when second person singular is subject, a final /n/ is deleted if there is at least one syllable between that /n/ and

25. The only exception is if the object is 1pl, in which case R25 doesn't apply. The rule corresponding to R25 is apparently more complex in Totonac (cf., Aschmann, 1952:139).

the first syllable of the stem. If R26 is not applicable, the same person and tense is marked by the suffix -t?i.[26] R26 is ordered before R24 stress placement and R22 V deletion (a feeding order) to give the following derivations:

	warm oneself+pt 2sgsub	warm oneself+pt 2plsub	see+pt 2sgsub	see+pt 2plsub
UF	s?on+t?i	s?on+t?ik	laqɛ?in	laqɛ?in+t?ik
R26	----	----	laqɛ?i	----
R24	s?ón̥t?i	s?ón̥t?ik	láqɛ?i	laqɛ?int?ik
R8	s?ón̥ti	s?ón̥tik	láqɛi	laqɛintik
	...	----	...	----
surf	s?ón̥ti̥	s?ón̥tik	láqɛi̥	laqɛintik

	speak+pt,2sgsub	speak+pt,2plsub	be scared+pt,2sgsub	be scared+pt 2plsub
UF	čiwinin	čiwinin+t?ik	talanan	talanan+t?ik
R26	čiwini	----	talana	----
R24	čiwíni	čiwiníNt?ik	talána	talanánt?ik
R22	čiwín	----	talán	----
R25	č?iwín	č?iwinint?ik	t?alán	t?alanánt?ik
R8	čiwín	čiwinintik	talán	talanántik
	...	...	...	----
surf	čibí̥	čibinintik	talḁ́	talanántik

	play+2sub,pt	play+pr	make,do+2sub,pt	make,do+pr
UF	qamanan	qamanan+ya	maka+t?i	maka+ya
R26	qamana	----	----	----
R24	qamána	qamanánya	makát?i	makáya
R22	qamán	----	----	----
R25	q?amán	----	mak?át?i	----
R7	?amán	----	----	----
R8	----	----	makati	----
	...	...	...	...
surf	?amḁ́	qamanḁ́	makati̥	makáy

---

26. It would be formally possible to mark all underlying 2sgsub,pt verb forms with the suffix -t?i and rewrite R23 to include the deletion of -t?i along with the /n/ or write a -t?i deletion rule ordered before R23. However, the added abstractness of such an approach, while simplifying the lexicon, would obviously make the rules more complex without apparent phonological motivation.

It should be mentioned here that "come" and "go", probably the two most frequently used verbs in TT (they appear not only frequently as verb roots but in many compound verb stems) are often exceptions to R26. When they occur in a compound verb stem, they conform to R26:

	toward/M/go,2sub	ref/come,2sub	face/go,2sub
UF	laka/pu/pin	li:/tʔan	ʔukši/pin
R25	lakʔapʔupʔin	----	ʔukšipʔin
R26	lakʔapʔupʔi	li:tʔa	ʔukšipʔi
	...	...	...
surf	lakapupi	li:ta	ʔukšípi

However, when they are the only morpheme in the verb stem and if there is no other suffix, they take the suffix -t?i and undergo R26 as if -t?i were a clitic:

	M+go,2sub+2sub,pt	irr≠come,2sub+2sub,pt	go,2sub+desid+2sub,pt
UF	pu:+pʔin+tʔi	ka≠tʔan+tʔi	pʔin+putun
R26	pu:pʔitʔi	katʔatʔi	pʔinpʔutʔu
	...	...	...
surf	pú:pitì	katátì	pímputù

To account for the various surface forms of the progressive and future suffixes, the following rules are posited:

R27 obligatory /y/ deletion

$$y \rightarrow \emptyset \;/\; \begin{bmatrix}+\text{cons}\\+\text{cont}\end{bmatrix} + _____ \begin{bmatrix}+\text{back}\\-\text{round}\end{bmatrix} +$$

R28 optional /y/ lar

$$y \rightarrow ? \;/\; \begin{bmatrix}-\text{cont}\end{bmatrix} + _____ \begin{bmatrix}+\text{back}\\-\text{round}\end{bmatrix} +$$

condition: optional

The /y/ of the suffixes -ya:, "future", and -ya, "progressive", is obligatorily deleted after a consonantal continuant and optionally becomes /?/ after a noncontinuant. Of the three nonconsonantal continuants (/h,w,y/) only /h/ and /w/ occur preceding -ya: or -ya in the underlying form. Following /w/, as expected, the /y/ is always present (thus, šawyá:, "it will burn"; not *šawá:). However, the /h/ may pattern here as a nonconsonantal continuant and retain the /y/ (loqohyá: "he will overnight") or as a consonantal continuant and undergo R27, deleting the /y/ (loqohá:).

R27 is ordered before R14 nasal assimilation (bleeding) and before R22 V deletion (feeding). R28 is ordered before R11 rounding, R12 /p,t/ weakening and R7 /q,h/ deletion (feeding orders). In the following forms derivations are given showing the application and nonapplication of R27 to /h/-final verb roots as well as the application and nonapplication of the optional R28, and the resulting alternate surface forms:

UF	come+pr min+ya	come+fut min+ya:	dig+pr≠already ah+ya≠ča		irr≠forget=fut ka≠kap+ya:	
R27	mina	mina:	ahača	----	----	----
R28	----	----	----	----	kakap?a:	----
R14	----	----	----	----	----	----
R11	----	----	----	----	----	kakawpya:
R12	----	----	----	----	----	kakawkya:
	...					
R22	mín	----	----	----	----	----
	...	...	...	...	...	...
surf	mi̯	miná:	áhaču̯	áhyaču̯	kakapa̯:	kakawkyá:

UF	pant+pr šap+ya		overnight+fut loqoh+ya:		eat+desid+pr ?u+putun+ya	think+pr pa:stak+ya	
R27	----	----	loqoha:	----	?uputuna	----	----
R28	šap?a	----	----	----	----	pa:stak?a	----
R14	----	----	----	----	----	----	----
R11	----	šawpya	----	----	----	----	----
R12	----	šawkya	----	----	----	----	----
					...		
R22	----	----	----	----	?uputún	----	----
	...	...	...	...	...	...	...
surf	šápa̯	šáwkyu̯	loqohá:	loqohyá:	?uputú̯	pa:stáka̯	pa:stákyu̯

UF	irr≠shell+fut ka≠p?as+ya:	bathe+pr≠already paš+ya≠ča	irr≠cry+fut ka≠tas+ya:
R27	kap?asa:	pašača	katasa:
	...	...	...
surf	kapasá:	pášaču̯	katasá:

UF	be born+pr paq+ya		irr≠give+fut ka≠štaq+ya:		meet+pr≠already paštoq+ya≠ča	
R28	paq?a	----	kaštaq?a:	----	paštoq?ača	----
R7	pa?a	----	kašta?a:	----	pašto?ača	----
	...	...	...	...	...	...
surf[27]	pá?u̯	páqyu̯	kašta?á:	kaštaqyá:	paštó?ču̯	paštóqyaču̯

27. These forms with those mentioned above (see under R12 /p,t/ weakening and fn. 17) present an interesting pattern of consonant alternation in the final position of the verb stem of some forms. There are three types of

The environment for the following rule occurs only in verbs which have the sequence /ni/ immediately preceding the suffix -ya:, "future":

$$\text{R29 /i/ deletion} \quad \overset{i}{[-\text{long}]} \rightarrow \emptyset \;/\; n____y\;\overset{V}{[+\text{stress}]}$$

condition: optional[28]

When /i/ is short, it is optionally deleted when following /n/ and preceding a sequence of /y/-stressed V. R29 is ordered after R24 stress placement and R27 /y/ deletion (a nonfeeding order) and before R14 nasal assimilation (a feeding order) to give the following forms:[29]

	irr≠owe+fut	irr≠give+ben+fut	irr≠kill+fut
UF	ka≠la:ni+ya:	ka≠štaq+ni+ya:	ka≠maqni:+ya:
R24	kala:niyá:	kaštaqniyá:	kamaqni:yá:
R27	----	----	----
R29	kala:nyá:	kaštaqnyá:	----
R14	kala:ñyá:	kaštaqñyá:	----
	...	...	...
surf	kala:ñyá:	kaštaqñyá:	kamaqni:yá:

---

consonant alternation (between forms preceding a vowel and forms preceding a consonant) in the final position of verb stems:

	--V	--C
a)	t ----------	k
b)	t ----------	q
c)	ʔ ----------	q

Verb stems of type a) are accounted for in R12 /p,t/ weakening and those of type c) are accounted for in R28. For type b) verb stems it may be that there is an underlying tq sequence; the surface forms would then be derived by a rule deleting the /t/ (similar to R5 /k/ deletion), and R28 /y/ lar.

	write+pt	write+pr	drink+pt	drink+pr
UF	ɬotq+li	ɬotq+ya	ʔotq+li	ʔotq+ya
R28	----	ɬotqʔa	----	ʔotqʔa
R7	----	ɬotʔa	----	ʔotʔa
delete /t/	ɬoqli	----	ʔoqli	----
	...	...	...	...
surf	ɬóqɬi̯	ɬótą̇	ʔóqɬi̯	ʔótą̇

It should be noted, however, that the sequence tq never occurs on the surface in TT and such an underlying sequence is without historical support.

28. This rule is "optional" only in that it does not occur in markedly slow speech.

29. Another option would be to rewrite R29 as a rule of n-i coalescence: niya: --> ñya:. In this form R29 would be unordered with respect to R14 and ordered after R27 /y/ deletion.

	irr≠sell+ben+fut	irr≠count+ben+fut	irr≠bring+fut
UF	ka≠st?a:+ni+ya:	ka≠pute?e+ni+ya:	ka≠li:min+ya:
R24	kast?a:niyá:	kapute?eniyá:	kali:minyá:
R27	----	----	kali:miná:
R29	kast?a:nyá:	kapute?enyá:	----
R14	kast?a:ñyá:	kapute?eñyá:	----
	...	...	...
surf	kasta:ñyá:	kapute?eñyá:	kali:miná:

In addition to R26 2sub /n/ deletion there is a more general rule of /n/ deletion in the TT verb: /n/ is deleted before a nonsyllabic continuant:

R30 /n/ deletion $n \rightarrow \emptyset \; / \; ____ \begin{bmatrix} -syll \\ +cont \end{bmatrix}]_{verb}$

R30 is ordered after R27 to give the following forms:

	come+pt	come+pr	go+1pl	go+pr	1obj≠hit+pt	1obj≠bite+pt
UF	min+li	min+ya	?an+wi	?an+ya	kin≠sa:+li	kin≠ɕ?ak?a+li
R27	----	mina	----	?ana	----	----
R30	mili	----	?awi	----	kisa:li	----
	...	...	...	...	...	...
surf	miɬ	mi̯	?aw	?a̯	kisá:ɬ	kinɕ?ak?aɬ

	eat+desid+pt	irr≠eat+desid+fut	sell+AP+pt	sell+AP+pr
UF	?u+putun+li	ka≠?u+putun+ya:	st?a:+nan+li	st?a:+nan+ya
R27	----	ka?uputuna:	----	st?a:nana
R30	?uputuli	----	st?a:nali	----
	...	...	...	...
surf	?upútuɬ	ku?uputuná:	sta:naɬ	sta:ná̯

When a stressed vowel immediately precedes the l-initial suffix, -li ("punctiliar"), the stress shifts to the vowel of the preceding syllable if the preceding syllable is not a clitic:

R31 stress shift

$$\underset{1}{V}\ \underset{2}{C_1}\ \underset{3}{\begin{bmatrix} V \\ +stress \end{bmatrix}}\ +\ \underset{4}{\begin{bmatrix} +cons \\ +cont \\ -nas \end{bmatrix}}\ \underset{5}{} \Longrightarrow \begin{bmatrix} 1 \\ [+stress] \end{bmatrix}\ 2\ \begin{bmatrix} 3 \\ [-stress] \end{bmatrix}\ 4\ 5\ ]_{verb}$$

condition: clitic bound

R31 is ordered after R24 stress placement and after R30 /n/ deletion (feeding order):

	M+come+pt	irr≠come+pt	3pl+write+pt	3pl+hit+pt
UF	pu:+min+li	ka≠min+li	ta+ƛoq+li	ta+sa:+li
R24	pu:mínli	ka≠mínli	taƛóqli	tasá:li
R30	pu:míli	ka≠míli	----	----
R31	pú:mili	----	----	tása:li
	...	...	...	...
surf	pú:miɬ	kamíɬ	taƛóqɬi	tása:ɬ

	pay+pt	irr≠exist+pt	buy+desid+pt	think+pt
UF	mapala+li	ka≠ʔali:n+li	ʔi+putun+li	pa:stak+li
R24	mapaláli	kaʔalí:nli	ʔiputúnli	pa:stákli
R30	----	kaʔalí:li	ʔiputúli	----
R31	mapálali	kaʔáli:li	ʔipútuli	----
	...	...	...	...
surf	mapálaɬ	kaʔáli:ɬ	ʔipútuɬ	pa:stákɬi

The suffix -ʔo:, "completive", is the only exception to R31 (listed in the lexicon [-R31]):

	sell+comp+pt	eat+comp+pt	think+comp+pt
UF	stʔa:+ʔo:+li	wahin+ʔo:+li	pa:stak+ʔo:+li
R24	stʔa:ʔó:li	wahinʔó:li	pa:stakʔó:li
R31	----	----	----
	...	...	...
surf	sta:ʔó:ɬ	ɬayʔó:ɬ	pa:stakʔó:ɬ

Following a vowel and preceding another back consonant (i.e., /k/ or /q/), /k/ becomes /h/:

R32 /k/ dissimilation $k \rightarrow h \; / \; V____ \begin{bmatrix} +back \\ -cont \end{bmatrix}$

	irr≠1sub≠work+pr	foc≠1sub≠wake+pt	3plobj+cure+pr
UF	ka≠k≠kuštu+ya	wa:≠k≠kuh+li	lak+kʔučʔu+ya
R32	kahkuštuya	wa:hkuhli	lahkʔučʔuya
	...	...	...
surf	kahkuštúy	wa:hkúhɬi	lahkučúy

Before giving examples of R32 /k/ dissimilation preceding /q/, the following rules need to be stated:

R33 /h/ assimilation $h \rightarrow X \; / \; ____q$

Preceding /q/, /h/ becomes the uvular fricative [χ]. However, [χ] is also a surface form of /q/:

R34 /q/ weakening $q \rightarrow X / ____ \begin{bmatrix} -\text{cont} \\ -\text{nas} \end{bmatrix}$

There is a partial overlap of the allophones of /q/ and /h/: preceding stops other than /q/, [X] is interpreted as /q/; preceding /q/, [X] is interpreted as /h/.

	irr≠1sub≠play+pt	foc≠1sub≠hear+pf	eye+know+pr
UF	ka≠k≠qamanan+li	wa:≠k≠qasmat+ta	laq+ka¢ʔay+ya
R32	kahqamananli	wa:hqasmatta	----
R33	kaXqamananli	wa:Xqasmatta	----
R34	----	----	laXka¢ʔaya
	...	...	...
surf	kaXqamánaɬ	ba:Xqasmáta̰	laXka¢ʔáy

	cl:day+three	cl:flat+two
UF	paq+tʔútu	ʔaq+tʔúy
R34	paXtʔútu	ʔaXtʔúy
	...	...
surf	paXtʔútṵ	ʔaXtʔúy

5. TT has two homophonous proclitics: /ʔiš-/ on nouns denoting "third person possesor", and /ʔiš-/ on verbs denoting "past". Both forms undergo the following rules except that the environment for R37 epenthesis occurs only in the 1sub forms of verbs:

R35 fricative deletion $\begin{bmatrix} +\text{cont} \\ -\text{voice} \end{bmatrix} \rightarrow \emptyset / ___ \neq \begin{bmatrix} +\text{cont} \\ -\text{voice} \end{bmatrix}$

R36 strident assimilation $[+\text{strid}] \rightarrow [+\text{ant}] / ____ C_0(V) \begin{bmatrix} +\text{strid} \\ +\text{ant} \end{bmatrix}$

R37 epenthesis $\emptyset \rightarrow \begin{bmatrix} +\text{back} \\ -\text{round} \\ -\text{long} \end{bmatrix} / š\neq ____ k\neq$

condition: optional

R38 /ʔiš-/ contraction $ʔi \rightarrow \emptyset / \begin{matrix} V____ \begin{bmatrix} +\text{strid} \end{bmatrix} \neq \\ ____ \begin{bmatrix} +\text{strid} \end{bmatrix} \neq \end{matrix} \left\{ \begin{bmatrix} +\text{cont} \end{bmatrix} \begin{bmatrix} -\text{cont} \\ -\text{del rel} \end{bmatrix} \right\}$

condition: optional

R35 is ordered after R3 /l/ devoicing (feeding order); R38 is ordered after R35 (bleeding order) and after R37 (feeding order); R37 is ordered before R4 and R5 optional and obligatory /k-/ deletion (bleeding order). It should be noted, however, that these two bleeding orders are, in a sense, "natural". When R37 is applied it produces a form that conforms to the SSS and thus

eliminates the motivation for the application of R4 and R5 (which are also SSS-motivated rules). The bleeding order between R35 and R38 is necessary to avoid complete deletion of the morpheme.

Where the optional R37 is applicable, the following derivations show the alternate surface forms resulting from its application or nonapplication.

	pst≠1sub≠think+pr		pst≠1sub≠have	
UF	ʔiš≠k≠pa:stak+ya		ʔiš≠k≠li:tahun	
R37	ʔišakpa:stakya	----	ʔišakli:tahun	----
R5	----	ʔišpa:stakya	----	ʔiškli:tahun
R36	----	ʔispa:stakya	----	----
R38	šakpa:stákya	----	šakli:tahun	škli:tahun
	...	...	...	...
surf	šakpa:stákaʔ	ʔispa:stákaʔ (1sgsub =3sgsub)	šakli:tuhúʔ	škli:tuhúʔ

	3poss≠beans	3poss≠tooth	3poss≠dog	3poss≠land
UF	ʔiš≠stápu	ʔiš≠taɬála:ti	ʔiš≠š?oy	ʔiš≠t?u:n
R35	ʔistápu	----	ʔiš?oy	----
R36	----	ʔistaɬála:ti	----	----
R38	----	staɬála:ti	----	št?u:n
	...	...	...	...
surf	ʔistápu	staɬála:ti	ʔiš?oy	štuː

	3poss≠avocado	pst≠sleep+pr	pst≠know+pr	pst≠plant+pr
UF	ʔiš≠lpaw	ʔiš≠ltata+ya	ʔiš≠mispa:+ya	ʔiš≠č?an+ya
R3	ʔišɬpaw	ʔišɬtataya	----	----
R35	ʔiɬpaw	ʔiɬtataya	----	----
R36	----	----	ʔismispa:ya	----
R38	----	----	smispa:ya	----
	...	...	...	...
surf	ʔiɬpaw	ʔiɬtatáy	smispá:y	ʔiščaʔ

6. Though we posit five underlying vowel positions for TT, the majority of surface occurrences of the mid vowels (/e/ and /o/) are derived from /i/, /a/, and /u/ and can be accounted for by the five rules discussed in this section.

R39 V lowering $V \rightarrow [-high] / ____ \begin{bmatrix}-cons\\-son\end{bmatrix} \overset{V}{\begin{bmatrix}+back\\-round\end{bmatrix}}$

condition: optional[30]

All [+high] vowels are optionally lowered when separated by /?/ or /h/ from a following long or short /a/.

R40 progressive V harmony $\overset{V}{\begin{bmatrix}+back\\-round\end{bmatrix}} \dashrightarrow \begin{bmatrix}-low\\ \alpha back\\ \beta round\end{bmatrix} / \overset{V}{\begin{bmatrix}\alpha back\\ \beta round\end{bmatrix}} \begin{bmatrix}-cons\\-son\end{bmatrix} ____$

condition: optional

The long and short forms of /a/ optionally harmonize in backness and rounding with a preceding vowel when separated from that vowel by /?/ or /h/. R39 and R40 together account for the following forms:

	1poss≠alone	ref+go	ref+go(2sgsub)[31]
UF	kin≠ʔamán	li:+ʔan	li:+pʔin
	...		
R39	keʔamán	le:ʔan	----
R40	keʔemán	le:ʔen	----
	...	...	...
surf	keʔemą́	leːʔę́	liːpi̯ʔ

30. The "optional" rules of V-harmony and assimilation in this section are optional only in that the underlying form occurs in slower speech, while the derived form occurs in normal speech. More specifically if we posit three basic tempos in TT, largo, andante, and allegro, we can say that R39 and R42 always apply in andante and allegro speech but not necessarily in largo speech. By way of contrast, R40 and R41 always apply in allegro speech, but usually not in largo and andante speech. An exception is ti+ʔa:n [teʔę́:] "he's going on" which is only rarely pronounced as [teʔą́:] or [tiʔą́:], even in largo speech. The village where most of this data was collected, Tierra Colorada, is considered by Tepehuas as a place where they "talk fast" (i.e., allegro = normal speech).

31. A form that is homophonous with li:pʔín ("you go in the direction of it") is li:pʔín ("you take it"). The latter which is by far the most common interpretation of the surface form, is considered to be a complex verb stem while the former is a prefix attached to a verb root. What needs to be mentioned here, however, is that the nonsecond person forms for "take" do not conform to R39 and R40 and thus have surface forms that contrast with the nonsecond forms for "go in the direction of":

	-stem- dir+go	-stem- ref+go	-st- dir+go+pr+1pl	-stem- ref+go+pr+1pl
UF	li:+ʔan	li:+ʔan	li:+ʔa n+ya+wi	li:+ʔa n+ya+wi
R39	le:ʔan	----	le:ʔa nyawi	----
R40	leʔen	----	le:ʔe nyawi	----
	...	...	...	...
surf	leʔę́	laːʔą́	le:ʔe ná:w	la:ʔa ná:w

	res+go	M+go+fut	the≠guayaba
UF	ti+ʔan	pu:+ʔan+ya:	niʔ≠ʔasíwi:ti
R39	teʔan	po:ʔanya:	neʔasíwi:ti
R40	teʔen	po:ʔonya:	neʔesíwi:ti
	...	...	...
surf	teʔé̞	po:ʔoná:	neʔesíb̥i:t̥i̥

R40 progressive V harmony does not apply across clitic boundaries if the /a/ is stressed:

	the≠centipede	my≠egg	your≠wild blackberry
UF	niʔ≠ʔámiš	kinʔ≠ʔášwa:ti	minʔ≠ʔá:ɸah
		...	
R39	neʔámiš	keʔášwa:ti	meʔáɸah
*R40	*neʔémiš	*keʔéšwa:ti	*meʔéɸah

R16 /h/ deletion has a feeding order with (i.e., precedes) the following optional rule:

R41 regressive V-harmony

$$\begin{bmatrix} V \\ +\text{back} \\ -\text{round} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{low} \\ \alpha\text{back} \\ \beta\text{round} \end{bmatrix} \; / \; \underline{\quad} \; \begin{bmatrix} -\text{cons} \\ +\text{son} \\ \alpha\text{back} \\ \beta\text{round} \end{bmatrix}$$

condition: optional

An /a/ optionally assimilates in backness and roundness to an immediately following vowel or semi-vowel.

	is+fut	is+pr	burn+fut	burn+pr
UF	tahun+ya:	tahun+ya	maktahi+ya:	maktahi+ya
R24	tahunyá:	tahúnya	maktahiyá:	maktahíya
R16	taunyá:	----	maktaiyá:	----
R41	tounyá:	----	makteiyá:	----
R18	townyá:	----	makteyyá:	----
	...	...	...	...
surf	townáː	tahúː	makteyáː	maktahíy

	help+pr	more	relative+pl
UF	aqtayhu+ya	apálay	talaqahun+ín
R24	aqtayhúya	----	----
R16	----	----	talaqaunín
R41	aqteyhúya	apáley	talaqounín
R18	----	----	talaqownín
	...	...	...
surf	aqteyhúy	apáley	talaqownːí

Such forms as these and the exceptional forms discussed under R26 suggest that there may be need to posit a distinct type of boundary preceding and following the verb stem.

	eat+fut	eat+pr	twenty
UF	wahin+ya:	wahin+ya	puš́áwn
R24	wahinyá:	wahi̯nya	----
R16	wainyá:	----	----
R41	weinyá:	----	puš́ówn
R18	weynyá:	----	----
	...	...	...
surf	ɓeynáː	ɓahíˀ	puš́ǫ́ẘ

In other surface forms the short form of /a/ optionally assimilates completely to a following vowel when separated from that vowel by /h/ or /?/.

R42 complete V assimilation

$$\begin{bmatrix} V \\ +\text{back} \\ -\text{round} \\ -\text{long} \end{bmatrix} \rightarrow [\alpha F] \; / \; \underline{\quad} \begin{bmatrix} -\text{cons} \\ -\text{son} \end{bmatrix} \; [\alpha F]_V$$

condition: optional

	irr≠3pl+buy+fut	break+pr	irr≠eat+2sgsub,pt
UF	ka≠ta+ʔi+ya:	taʔe+ya	ka≠ʔu+tʔi
R42	katiʔiya:	teˆeya	kuʔutʔi
	...	...	...
surf	katiʔiyáː	teʔéy	kuʔúˀtiˀ

	irr≠be+fut	irr≠buy+fut+2sgsub
UF	ka≠hun+ya:	ka≠ʔi+ya:+ʔi
R42	kuhunyá:	kiʔiya:ʔi
	...	...
surf	kuːnáː	kiʔiyéːʔiˀ

There are some problems with R41 and R42 as they now stand: 1) are the two rules collapsable; 2) if not, which is ordered before the other; and, 3) how are they ordered in relation to R16 /h/ deletion? These questions are, of course interrelated.

An argument in favor of collapsing R41 and R42 is their similarity: they are both examples of regressive assimilation of /a/ to a high vowel and are both optional.

In looking over the data we find that whenever the following vowel is stressed the /a/ assimilates completely, (becoming [i] or [u]), whereas when the following vowel is unstressed the /a/ usually only assimilates partially (becoming [e] or [o]). This apparently "natural" process where /a/ assimilates only partially to a following unstressed high vowel, but assimilates completely to a following stressed high vowel, could be used to collapse R41 and R42 as follows:

R42a $\begin{bmatrix} V \\ +back \\ -round \end{bmatrix} \rightarrow \begin{bmatrix} -low \\ \langle +high \rangle \\ \alpha back \\ \beta round \end{bmatrix} / \underline{\quad} \begin{bmatrix} -cons \\ -syll \end{bmatrix} \begin{bmatrix} +high \\ \alpha back \\ \beta round \\ \langle +stress \rangle \end{bmatrix}$

condition: optional

However, we are still left with the problem of accounting for the forms in which /a/ assimilates completely with the following vowel even though it is not stressed (e.g., [ku:ná:] from /ka≠hun+ya:/ and [kati?iyá:] from /ka≠ta+?i+ya:/. In each such exception to R42a, the underlying /a/ is part of a proclitic or a prefix and assimilates to the first vowel of the verb stem when separated from that vowel by /h/ or /?/. If we were to adopt the collapsed form of R41 and R42 as stated in R42a, we would have to posit another rule, ordered later in the derivation specifically to handle such forms:

R42b $\begin{bmatrix} V \\ -high \end{bmatrix} \rightarrow [\alpha F] / \underline{\quad} + \begin{bmatrix} -cons \\ -son \end{bmatrix} \begin{bmatrix} V \\ \alpha F \end{bmatrix}_{stem}]_{verb}$

condition: optional

R16 /h/ deletion would then be ordered after R42b, and with R17 vowel lengthening, would produce the following forms:

	irr≠become+fut	is+pr	irr≠3pl+buy+fut	irr≠go+fut+2sgsub
UF	ka≠hun+yá:	tahún+ya	ka≠ta+?i+yá:	ka≠p?in+yá:+?i
R42a	kohunyá:	tuhúnya	kate?iyá:	kap?inyé:?i
R42b	kuhunyá:	----	kati?iyá:	----
R16	kuunyá:	----	----	----
R17	ku:nyá:	----	----	----
	...	...	...	...
surf	ku:ná:	tuhú̯	kati?iyá:	kap?iné:?i̯

It will be noted that the above analysis correctly accounts for the 2sgsub,+fut form of the verb ([kap?iné:?i]) which the analysis using R41 and R42 cannot account for. However, it should also be noted that R42a and R42b would produce incorrect results when applied to the clitics ka:- and wa:- ("doubt" and "focus") or to the prefixes la:- and t?a:- ("reciprocal" and "comitative"). The long /a/ remains unchanged in all surface occurances of these forms: ka:?íl, "I think he bought it"; wa:?uputún, "he wants to eat it"; kla:hunáw, "we call you"; kint?á:?il, "he bought it with me".

An additional argument against R42a and R42b is the complexity of the rules when compared to R41 and R42. Therefore, it is suggested that a more elegant option would be to retain R41 and R42 as two distinct rules and posit contingent ordering relations between R16 /h/ deletion and R42 to account for the different surface forms (Anderson, 1974:159ff). For those forms where the /a/ is contained within a proclitic or prefix, R42 would precede R16 (a nonbleeding order, but bleeding R41):

	irr≠become+fut	3pl+buy+pr	int+put in+pr	irr≠int+put in+fut
UF	ka≠hun+yá:	ta+ʔi+ya	ta+hú+ya	ka≠ta+hu+yá:
R42	kuhunyá:	tiʔiya	tuhúya	katuhuyá:
R16	kuunyá:	----	----	katuuyá:
(R41)	----	----	----	----
	...	...	...	...
surf	ku:ná:	tiʔíy	tuhúy	katu:yá:

For all other forms, R16 would precede R42 (a bleeding order but nonbleeding R41):

	is+fut	is+pr	burn+fut	eat+ssgsub+pt
UF	tahun+yá:	tahún+ya	maktahi+yá:	wahin+R26
				...
R16	taunyá:	----	maktaiyá:	wái
R42	----	tuhúnya	----	----
R41	tounyá:	----	makteiyá:	wéi
	...	...	...	...
surf	towná:	tuhú̯	makteyá:	béy

Both analyses discussed here have two rules. However, the added complexity that comes from having contingent ordering relations between R16 and R42 is more than compensated for by the simpler nature of the rules. Therefore, the latter analysis is preferred.

The following rule, in which a high vowel is lowered when contiguous to /q/, is attested for all language groups in the Totonacan family:

R43 V-/q/ assimilation V --→ [-high] / q

R43 is ordered before R7 /q,h/ deletion (nonbleeding):

	int+eye+down in+2sg,pt	int+hand+down in+2sg,pt
UF	ta+laq+hu+tʔi	ta+maq+hu+tʔi
metathesis[32]	talahqutʔi	tamahqutʔi
R43	talahqotʔi	tamahqotʔi
R25	tʔalahqʔotʔi	tʔamahqʔotʔi
R7	tʔalaʔotʔi	tʔamaʔotʔi
	...	...
surf	tàlaʔóti̯	tàmaʔóti̯
	("you looked down into it")	("you put your hand down into it")

32. The only attested rule of metathesis in TT is that which changes the sequence /qh/ to /hq/. The two forms given here are the only forms that are known to undergo this process; in no other attested forms does the sequence /qh/ occur on the morphophonemic level.

The two forms above are the only forms attested that give alternation evidence for a high vowel being lowered when contiguous to /q/. However, the rule correctly expresses a major limitation on the distribution of the high vowels: /i/ and /u/ never occur contiguous to /q/.

The rules discussed previously in this section account for the majority of occurences of /e/ and /o/ in TT. Of those that remain, virtually all can be attributed historically to the rule of V-/q/ assimilation followed by R7 /q,h/ deletion:

gloss	TT	cognate	
yuca	šʔew	qʔošqʔewi	(Totonac)
good	ʔoš	qʔoš	(H)
dog	šʔoy	šqʔoy	(H)
pretty	liʔéča	lilaqatit	(Totonac)

Each of the four forms above is a member of a minimal pair in TT: šʔiw, "we would have bought it"; ʔuš, "bumblebee"; šʔuy, "he was eating"; and liʔíča, "it's hot (weather)".

Since the same rules that provide a diachronic explanation for the mid-vowels in the above forms continue to have a synchronic application, it would be formally possible to assign only high vowels to the words with a contiguous /q?/ in their underlying forms. R43 V-/q/ assimilation and R7 /q,h/ deletion would then generate the correct surface forms:[33]

	yuca	pst≠buy+1pl	good	bumblebee	dog	pst≠eat+pr
UF	šqʔiw	ʔiš≠ʔi+wi	qʔuš	ʔuš	šqʔuy	ʔiš≠ʔu+ya
R8	šqiw	----	quš	----	šquy	----
R43	šqew	----	qoš	----	šqoy	----
R7	šʔew	----	ʔoš	----	šʔoy	----
	...	...	...	...	...	...
surf	šʔew	šʔiw	ʔoš	ʔuš	šʔoy	šʔuy

Such an analysis, without complicating the grammar or adding any rules, would present a simple three-vowel system rather than the more complex five-vowel system; and, thus, while correctly reflecting the historical situation, would provide a more elegant analysis. However, there is no alternation evidence on the surface to suggest, for example, that ʔoqli "he drank it" has an underlying form such as ʔuqli, or that ʔoš, "good", might have an underlying form such as qʔuś, or that šʔew, "yuca", has an underlying form

---

33. R7 would have to be altered somewhat to laryngealize the /q/ before a laryngealized vowel. This would result in /?/ followed by laryngealized vowels (śʔoy , śʔiw , etc.) which are acceptable alternate pronunciations (to śʔoy , śʔiw , etc.).

such as šq?iw.[34] In Totonac and H, where the /q?/ is still present such underlying forms would be plausible. In TT, however, the loss of /q/ before /?/ has brought about a five vowel system which has been reinforced by the influx of numerous Spanish loans. Thus, five underlying vowel positions are posited for TT, while Aschmann correctly posits only three for highland Totonac.

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34. There is one attested vestige of the three vowel system in TT diminutives or baby-talk. Diminutives are formed by the fronting of /q/ to /k/ and by a "flip-flop" of the alveolar and alveopalatal fricatives and affricates (š→ s, s → š; č → ć, ć → č). Thus, the diminutive form of páqča, "tomato", is pákća. However, there are two diminutive forms for šʔoy, "dog": sʔoy or skʔuy; the latter is here considered to be a vestige of the old underlying form, šqʔuy. It is also likely that a word for "pretty", kʔus, comes from an old diminutive form of ʔoš, "good" (once underlying qʔuš), though ʔos is the present diminutive for "good". All other diminutive forms support a five vowel analysis. Thus, the diminutive form of šʔew, "yuca", ʔoqli , "he drank it", and šqoy, "leaf", are sʔew, ʔokli, and skoy; skʔiw, ʔukli and skuy are unacceptable.

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A publication of the Mexico Branch of the Summer Institute of Linguistics, Inc., designed primarily for the publication and distribution of data-oriented or preliminary reports in linguistics and related fields. Edited by the Linguistics Coordinator, Instituto Lingüístico de Verano, Apartado 22067, México 22, D.F. Selling price: 60.00 (Mex. Cy.0, $2.50 (U.S.) plus postage and handling. Copies may be obtained by writing to the above address.